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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,337	07/30/2003	Guo Mian	HSJ920030047US1	1402

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Hitachi Global Storage Technologies
Intellectual Property Law
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EXAMINER	
MERCEDES, DISMERY E	

ART UNIT	PAPER NUMBER
2651	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/631,337	MIAN ET AL.	
	Examiner	Art Unit	
	Dismery E Mercedes	2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/16/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on July 16, 2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 5,7-8, 21,22,24,31 are rejected under 35 U.S.C. 102(e) as being anticipated by Seigler et al.(US 2002/0145832 A1). Seigler et al. discloses a data storage apparatus comprising (page 2, ¶0019, lines 4-5): a read head (page 2, ¶0022, lines 7-8) for reading magnetic data from a recorded portion of a recording layer of a perpendicularly recorded magnetic medium (page 2, ¶0022, lines 2-3); a stabilizer for magnetically stabilizing a portion of an underlayer of the magnetic medium directly below the recorded portion simultaneously while the read head is reading said magnetic data from the recorded portion (page 2, ¶0019, lines 1-4 & ¶0029); and the read head and the stabilizer being separate structures (as depicted in FIG.3, "34" and "46").

As to Claim 2, Seigler et al. further discloses a data storage apparatus as claimed in base claim 1 wherein the stabilizer includes: a first and second elongated probes (FIG.2, "36 and 32", page 2, ¶0022) and a bridge with the bridge interconnecting the first and second probes (FIG.2, "35", page

2, ¶0022); and the read head being located between the first and second probes (as depicted in FIG.2, "34", page 2, ¶0022).

As to Claim 5, Seigler et al. further teaches a data storage apparatus as claimed in base claim 1 further comprising: biasing means for applying a constant bias field to the stabilizer (page 2, ¶0019, lines 1-4 & ¶0029).

As to Claim 7, Seigler et al. further discloses a data storage apparatus as claimed in base claim 1 further comprising: a write head which has first and second pole pieces; and one of the first and second probes and one of the first and second pole pieces being a common component (as depicted in FIG.2, page 2, ¶0022).

As to Claim 8, Seigler et al. further discloses a data storage apparatus as claimed in claim 7 wherein the stabilizer includes: first and second elongated probes (FIG.2, "36 and 32", page 2, ¶0022) and a bridge with the bridge interconnecting the first and second probes (FIG.2, "35", page 2, ¶0022); and the read head being located between the first and second probes (as depicted in FIG.2, "34", page 2, ¶0022).

4. As to Claims 21 & 31, 22,24, they are method claims corresponding to apparatus claims 1,2, 5,8, respectively and they are therefore rejected for similar reasons set forth in the rejection of claims 1,2, 5,8, repectively.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seigler et al. in view of Hu et al (US 6,025,977). Seigler et al. teaches a data storage apparatus as in claim 1, but fails to teach the first probe being closer to the read head than the second probe; a probe being recessed from the head surface plane and the second probe being coextensive with the head surface plane. However, Hu et al teaches the read head having a head surface which defines a head surface plane; the first probe being closer to the read head than the second probe; a probe being recessed from the head surface plane and the second probe being coextensive with the head surface plane (on col.6, lines 35-45).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to place the read head closer to pole that is coextensive with the surface plane, because Hu et al. teaches that such structure reduces the aspect of ratio of the resist during fabrication of the pole which enables the construction of pole tip at the ABS with a thin layer of resist, thus allowing good definition which enhances the bit density of the head.

As to Claim 23 is a method claims corresponding to apparatus claims 3, respectively and they are therefore rejected for similar reasons set forth in the rejection of claims 3, respectively.

7. Claim 4 is rejected as being unpatentable over Seigler et al. in view of Hu et al (US 6,025,977), further in view of Santini et al. (US Pub. 2003/0137779 A1). The combination of Seigler et al. and Hu et al. disclose a data storage apparatus as in claim 3, but fails to teach that the first probe increases in magnetic material volume as it extends toward the head surface.

However, Santini et al discloses a probe increases in magnetic material volume as it extends toward the head surface (page 4-5, ¶0056, lines 12-17). It would have been obvious to one of ordinary skill in the art, at the time of the invention was made to modify the data storage apparatus of Seigler et al. and Hu et al. by using a probe as taught by Santini et al., it would provide the data storage apparatus of Seigler et al. and Hu et al. with the enhanced capability to minimize side writing when the probe is skewed at the outer and inner circular tracks of the rotating magnetic disk (page 5, ¶0056, lines 18-22).

8. Claim 6 and 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over, Seigler et al. Dimitrov (Dimitrov et al. US 200//0075586 A1).

Seigler et al. discloses a data storage apparatus as claimed in claim 5, but fails to teach a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer.

However, Dimitrov, discloses a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer on (page 3, ¶0020, lines 11-13), where the magnetic field is 5000 Oe, and the soft underlayer is 2500 Oe). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seigler et al.'s system with Dimitrov's parameters, because Dimitrov teaches adjusting the magnetic field to bias the soft underlayer results in the maximization of the signal to noise ratio during read back process to reduce noise (page 1, ¶0013-page2, ¶0013, lines 7-16 of Seigler et al.), thus improving the read characteristics of the recording head.

As to Claim 25 is a method claim corresponding to apparatus claims 6, and is therefore rejected for similar reasons set forth in the rejection of claims 6, respectively.

9. Claim 9 is rejected as being unpatentable over Seigler et al. in view of Hu et al (US 6,025,977). Seigler et al. teaches a data storage apparatus as in claim 8, but fails to teach the first probe being closer to the read head than the second probe; a probe being recessed from the head surface plane and the second probe being coextensive with the head surface plane. However, Hu et al teaches the read head having a head surface which defines a head surface plane; the first probe being closer to the read head than the second probe; a probe being recessed from the head surface plane and the second probe being coextensive with the head surface plane (on col.6, lines 35-45).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to place the read head closer to pole that is coextensive with the surface plane, because Hu et al. teaches that such structure reduces the aspect of ratio of the resist during fabrication of the pole which enables the construction of pole tip at the ABS with a thin layer of resist, thus allowing good definition which enhances the bit density of the head.

10. Claims 10,11 are rejected as being unpatentable over Seigler et al. in view of Hu et al (US 6,025,977), further in view of Santini et al. (US Pub. 2003/0137779 A1). The combination of Seigler et al. and Hu et al. disclose a data storage apparatus as in claim 9, but fails to teach that the first probe increases in magnetic material volume as it extends toward the head surface.

However, Santini et al discloses a probe increases in magnetic material volume as it extends toward the head surface (page 4-5, ¶0056, lines 12-17). It would have been obvious to one of ordinary skill in the art, at the time of the invention was made to modify the data storage apparatus of Seigler et al. and Hu et al. by using a probe as taught by Santini et al., it would provide the data storage apparatus of Seigler et al. and Hu et al. with the enhanced capability to minimize side writing when the probe is skewed at the outer and inner circular tracks of the rotating magnetic disk (page 5, ¶0056, lines 18-22 of Santini et al.).

As to Claim 11, the teachings of Seigler et al. in view of Hu et al. and Santini et al. are incorporated herein. Seigler et al. further teaches a data storage apparatus further comprising: biasing means for applying a constant bias field to the stabilizer (page 2, ¶0019, lines 1-4 & ¶0029 of Seigler).

11. Claims 12,13 are rejected as being unpatentable over Seigler et al. in view of Hu et al. and Santini et al., further in view of Dimitrov (Dimitrov et al. US 2002/0075586 A1).

The combination of Seigler et al. in view of Hu et al. and Santini et al., discloses a data storage discloses a data storage apparatus as claimed in claim 11, but fails to teach a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer.

However, Dimitrov discloses a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer on (page 3, ¶0020, lines 11-13, where the magnetic field is 5000 Oe, and the soft underlayer is 2500 Oe). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system as taught by Seigler et al., Hu et al. and Santini et al., system with Dimitrov's parameters, because Dimitrov teaches that adjusting the magnetic field to bias the soft underlayer results in the maximization of the signal to noise ratio during read back process to reduce noise (page 1, ¶0013-page2, ¶0013, lines 7-16 Dimitrov), thus improving the read characteristics of the recording head.

As to Claim 13, Santini et al further discloses a read head comprises; nonmagnetic first and second read gap layers; a sensor located between the first and second read gap layers; ferromagnetic first and second shield layers; and the first and second read gap layers being located between the first and second shield layers on (page 3, ¶0046, lines 5-8 and page 6, claim 7 of Santini et al). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement Santini's technique in the system taught by Seigler et al., Hu et al. and Dimitrov et al with Santini's

technique, because it would provide such system with the enhanced capability of changing the resistance of the of the sensor due to the external magnetic field, thus creating potential changes that are then processed as readback signals (Santini, page 3, ¶0046, lines 9-14).

12. Claims 14-16,26-28 are rejected as being unpatentable over Seigler et al. in view of Hu et al (US 6,025,977).

As to Claim 14, Seigler et al. discloses a data storage apparatus as claimed in base claim 1, but does not explicitly teaches a write head; and in addition to the read head being located between the first and second probes, the write head also being located between the first and second probes.

However, Hu et al. discloses a write head located between a first and second pole piece on (col.6-line 61-col.7, line 31 & FIG.7). Therefore, it would have been obvious to one of ordinary skill in the art to have used a "piggyback head" as taught by Hu et al. in Seigler's data storage system, because it would provide Seigler et al.'s system with the advantage of reducing the effect of domain wall reorientation after high EMF write operations on the shield layers, and therefore promoting a constant bias point for the sensor (col.6, lines 64-67 of Hu et al).

As to Claim 15, the teachings of Seigler et al. in view of Hu et al are incorporated herein, Seigler et al. further teaches a stabilizer includes: first and second elongated probes (FIG.2, "36 and 32", page 2, ¶0022 of Seigler et al.) and a bridge with the bridge interconnecting the first and second probes (FIG.2, "35", page 2, ¶0022 of Seigler et al.); and the read head being located between the first and second probes (as depicted in FIG.2, "34", page 2, ¶0022 of Seigler et al.).

As to Claim 16, the teachings of Seigler et al. in view of Hu et al are incorporated herein, Hu et al. further discloses 16, the read head having a head surface which defines a head surface plane; the first probe being closer to the read head than the second probe; a probe being recessed from the head surface plane and the second probe being coextensive with the head surface plane (on col.6,

lines 35-45). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to place the read head closer to pole that is coextensive with the surface plane, because Hu et al. teaches that such structure reduces the aspect of ratio of the resist during fabrication of the pole which enables the construction of pole tip at the ABS with a thin layer of resist, thus allowing good definition which enhances the bit density of the head.

As to Claims 26,27,28 they are method claims corresponding to apparatus claims 14, 15,16 respectively and they are therefore rejected for similar reasons set forth in the rejection of claims 14,15,16 respectively.

13. Claim 17,18, 29 are rejected as being unpatentable over Seigler et al. in view of Hu et al., further in view of Santini et al (US Pub. 2003/0137779). The combination of Seigler et al. and Hu et al. disclose a data storage apparatus as in claim 3, but fails to teach that the first probe increases in magnetic material volume as it extends toward the head surface.

However, Santini et al discloses a probe increases in magnetic material volume as it extends toward the head surface (page 4-5, ¶0056, lines 12-17 & page 6, claim 8). It would have been obvious to one of ordinary skill in the art, at the time of the invention was made to modify the data storage apparatus of Seigler et al. and Hu et al. by using a probe as taught by Santini et al., it would provide the data storage apparatus of Seigler et al. and Hu et al. with the enhanced capability to minimize side writing when the probe is skewed at the outer and inner circular tracks of the rotating magnetic disk (page 5, ¶0056, lines 18-22 of Santini et al.).

As to Claim 18, the teachings of Seigler et al., Hu et al and Santini et al are incorporated herein. Seigler et al. further discloses biasing means for applying a constant bias field to the stabilizer (page 2, ¶0019, lines 1-4 & ¶0029 of Seigler et al.).

As to Claims 29 is a method claim corresponding to apparatus claims 18 respectively and they are therefore rejected for similar reasons set forth in the rejection of claims 18 respectively.

14. Claims 19, 20 and 30 are rejected as being unpatentable over Seigler et al. et al. in view of Hu et al. and Santini et al., further in view of Applicants Admitted Prior Art, hereinafter, Dimitrov (Dimitrov et al. US 2002/0075586 A1). The combination of Seigler et al. in view of Hu et al. and Santini et al., discloses a data storage discloses a data storage apparatus as claimed in claim 18, but fails to teach a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer.

However, Dimitrov discloses a magnetic field is greater than two (2) times the magnetic coercivity of the soft underlayer on (page 3, ¶0020, lines 11-13, where the magnetic field is 5000 Oe, and the soft underlayer is 2500 Oe). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system as taught by Seigler et al. et al., Hu et al. and Santini et al., system with Dimitrov's parameters, because Dimitrov teaches that adjusting the magnetic field to bias the soft underlayer results in the maximization of the signal to noise ratio during read back process to reduce noise (page 1, ¶0013-page2, ¶0013, lines 7-16 Dimitrov), thus improving the read characteristics of the recording head.

As to Claim 20, Santini et al. further discloses read head comprises; nonmagnetic first and second read gap layers; a sensor located between the first and second read gap layers; ferromagnetic first and second shield layers; and the first and second read gap layers being located between the first and second shield layers on (page 3, ¶0046, lines 5-8 and page 6, claim 7 of Santini et al). It would have been obvious to one of ordinary skill in the art, at the time of the invention was made to modify the data storage apparatus of Seigler et al. and Hu et al. by using a probe as taught by Santini

et al., it would provide the data storage apparatus of Seigler et al. and Hu et al. with the enhanced capability to minimize side writing when the probe is skewed at the outer and inner circular tracks of the rotating magnetic disk (page 5, ¶0056, lines 18-22 of Santini et al.).

As to Claim 30 is a method claim corresponding to apparatus claims 19 respectively and they are therefore rejected for similar reasons set forth in the rejection of claims 19 respectively.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Moser et al. (US 5,900,728) is cited for disclosing an alternating current magnetic force microscopy system with probe having integrated coil.

Khizroev et al. (US 6,667,848 B1) is cited for disclosing a perpendicular magnetic recording head with means for suppressing noise from soft magnetic underlayer of recording media.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dismery E Mercedes whose telephone number is 703-306-4082. The examiner can normally be reached on Monday - Friday, from 9:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 703-305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dismery E Mercedes
Examiner
Art Unit 2651

DM

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